

ABSTRACT:

This invention relates to a method of cutting, comprising the steps of:

a) providing an abrasive cutting tool comprising:

i) a substrate surface having a plurality of teeth extending therefrom, and

ii) a single layer of abrasive grains chemically bonded to at least a portion of each tooth to define a plurality of cutting levels parallel to the substrate surface, the cutting levels comprising a first uppermost cutting level and a second uppermost cutting level, the grains having a predetermined concentration, size and toughness,

b) moving the substrate surface in an intended direction of rotation,

c) contacting the uppermost cutting level of at least one tooth to a workpiece at a point of contact,

d) applying a constant force to the tool directed at the point of contact,

wherein the constant force is sufficient to cut the workpiece, the strength of the bond is sufficient to resist peeling, the predetermined concentration, size and toughness of the plurality of grains are such that the grains of the uppermost cutting level fracture under application of the constant force, and the hardness and thickness of the teeth are such that the portion of each tooth associated with the first uppermost cutting level abrades at about the same rate as the grains of the first uppermost cutting level fracture,

thereby causing essentially simultaneous removal of the grains of the first uppermost cutting level from their bond and abrasion of the portion of each tooth associated with the first uppermost cutting level, and
thereby exposing the grains of the second uppermost cutting level to the workpiece.